

Name: \_\_\_\_\_

## Algebra 1A 2016 Final Exam Practice Test

### Part I: Variables and Translations, Expressions, Distributive Property, Properties of Numbers

Due: \_\_\_\_\_

**Variables and Translations: Define variables and write an equation to model each situation. (4 points)**

The total length of the edges of a cube is 10 times the length of an edge.

The total cost of lunch is \$7.50 times the number of people at the table.

**Simplifying: Please simplify each expression completely. BOX your final answers.**

a)  $-9(-x + 7)$

c)  $x + y + 1 + x + 2 + y + 1$

b)  $-4(h - 2) + 6(2h + 6)$

d)  $(2r - 7)^4$

**Using complete sentences and algebraic terms, please explain how expressions and equations are alike and how they are different. (Give at least one similarity and one difference.)**

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**Distributive Property: Please complete the following problems.**


**Properties of Numbers: Describe each number as completely as possible using all terms that apply. Choose from: irrational, rational, integer, whole, and natural.**

a) -5	d) 0
b) 0.25	e) 109
c) pi	f) $\sqrt{2}$

**Algebraic Properties: Please write the CAPITAL LETTER of the property represented by each statement.**

**A. Associative Property      B. Commutative Property      C. Distributive Property**  
**D. Identity Property of Addition      E. Identity Property of Multiplication**  
**F. Inverse Property of Addition      G. Inverse Property of Multiplication**

a. $8(1) = 8$ _____	b. $8 + (7 + 9) = 8 + (9 + 7)$ _____
c. $8 + (-8) = 0$ _____	d. $8\left(\frac{1}{8}\right) = 1$ _____
e. $8(7 - 9) = 8(7) - 8(9)$ _____	f. $8 + 0 = 8$ _____
g. $8 + (7 + 9) = (8 + 7) + 9$ _____	

## Part II: Square Roots, Pythagorean Theorem, Central Tendency, Probability, and Population and Sample

Due: \_\_\_\_\_

<b>Square Roots:</b> Use a calculator to find the square root. Round your answer to the nearest hundredth.	
$\sqrt{36}$	$-\sqrt{576}$
$\sqrt{\frac{25}{49}}$	$\sqrt{x+2x}$ when $x = 12$

<b>Pythagorean Theorem:</b> Use the PT and/or its converse to answer each question.
a) Write the Pythagorean Theorem.
b) Three sides of a triangle are 25 feet, 65 feet and 60 feet. Is this a right triangle? Show your work.
c) Jack leans a ladder 8 feet from the base of the beanstalk in order to climb it. The ladder is 16 feet long. How high on the beanstalk will the ladder reach? <b>Draw a diagram and use the PT to solve. Round to the nearest tenth, if necessary.</b>

**Measures of Central Tendency Word Problem: Complete problems #1 and #2. (Note: you will have CHOICE on the Final Exam.)**

**Problem #1:** Billy Bob scored the following on his first four math tests: 83, 87, 92, and 89. What is the minimum score Billy Bob needs on his fifth test in order to have a mean of 90? **Write and solve an equation to solve this problem.** Do you think Billy Bob can achieve this goal? Explain.

**Problem #2:** In her first four years of professional softball, Lena Leroy hit 40, 42, 50, and 25 home runs. What is the minimum number of homeruns Lena will need in her fifth year in order to have a mean of 45 homeruns per year? **Write and solve an equation to solve this problem.** Do you think Lena can achieve this goal? Explain.

**Independent and Dependent Events.** Suppose you choose two numbers from a box containing ten cards with the numbers 1-10. State whether the two events are independent or dependent. Then find each probability.

P(6 then an even number) without replacing the card

P(1 and an odd number) with replacing the card

P(an even number then an odd number) without replacing the card

P(an even number and an odd number) with replacing the card

<b>Define:</b>
<b>Population</b>
<b>Sample</b>
<b>Bias</b>

<p><b>Situation:</b> A vegetable garden has 100 tomato plants arranged in a 10-by-10 array. The gardener wants to know the average number of tomatoes on the plants.</p> <p>Because counting the number of tomatoes on all the plants is too time-consuming, the gardener decides to choose 10 plants at random to find the average number of tomatoes on his plants.</p>
What is the population?
What is the sample?

Which of the three scenarios would be considered a biased sample? WHY?
A. A random sample of students at a middle school shows that 10 students prefer listening to rock, 15 students prefer listening to hip-hop, and 25 students no must while they exercise. It is concluded that half the students prefer no music while exercising.
B. Every tenth person who walks into a department store is surveyed to determine his or her music preference. Out of 150 customers, 70 stated they prefer rock music. The manager concludes that about half the customers prefer rock music.
C. The customers of a music store are surveyed to determine their favorite leisure time activity. The results show that 85% of people like to listen to music in their leisure time.

### Part III: Solving Equations and Word Problems

Due: \_\_\_\_\_

Using complete sentences and algebraic terms, please explain how an equation can have a solution of ALL REAL NUMBERS. Use an example for support.

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Solve the following equations. Show ALL of your work and BOX your final answers.

a)  $-8 + x = 3$

c)  $\frac{9}{10}h = -45$

b)  $5b = -20$

e)  $-7(2h - 1) = 21$

e)  $-6(y + 1) - 2y = 4(-2y + 1) - 10$

**9. WITHOUT ACTUALLY SOLVING, please explain how you would solve the equation:  $-5x + 6 = 36$ .** Use complete sentences and algebraic terms. Please be sure to JUSTIFY each step.

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**18. Linear Relationship Word Problem (5 points): Please complete both problems. On the final exam you will have a choice.**

a. Max sells lemonade for \$2 per cup and candy for \$1.50 per bar. He earns \$425 selling lemonade and candy. Write a linear model that relates the number of cups of lemonade he sold to the number of bars of candy he sold. If Max sold 90 bars of candy, how many cups of lemonade did he sell?

b. A cell phone plan costs \$40 a month for unlimited data plus \$0.15 per text message. Write a linear model that represents the monthly cost of this cell phone plan if the user sends,  $t$ , text messages. If you send 200 text messages, how much would you pay according to this plan?

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## Part IV: Rates, Unit Rates, Ratios, Proportions, DRT

Due: \_\_\_\_\_

Rate:

Unit Rate:

**Proportion:** BOX your final answer.

$$\frac{9}{6} = \frac{x}{10}$$

$$\frac{4}{m-8} = \frac{8}{2}$$

$$\frac{7}{9} = \frac{b}{b-10}$$

$$\frac{x-3}{x} = \frac{9}{10}$$

**Proportion:** Solve each problem to find the missing side length. BOX your final answer.

The ratio of the weight of Meg's cat to the weight of Anne's cat is 5:7. Meg's cat weighs 20 kg. How much more does Anne's cat weigh?

The scale of a map is 1 inch : 20 miles. What is the actual distance between two towns that are 3.5 inches apart?



**DRT: (Note: on the Final Exam, you will have a choice.)**

**Problem #1:** Elise left for the day, but she forgot her cell phone. She is riding in a car that is driving an average of 45 mph. Anthony, seeing her cell phone, hops on his motorcycle an hour later to bring her the cell phone. If he is driving at an average of 55 mph, after how many hours will he catch up to Elise?

a. What type of DRT problem is this? \_\_\_\_\_

b. What is the general equation for this type of problem? \_\_\_\_\_

c. Define your variable. \_\_\_\_\_

d. Fill in the DRT chart.

	<b>r</b>	<b>t</b>	<b>D</b>

d. Write and solve an equation.

e. ANSWER the question.

**Problem #2:** Megan and Jorge are both at school, preparing to leave for summer vacation. Megan leaves at 3 pm, traveling north at a speed of 60 mph, to her cabin in Maine. Jorge leaves at 4 pm, traveling south at a speed of 50 mph, to his beach house in Florida. At what time will Megan and Jorge be 600 miles apart?

a. What type of DRT problem is this? \_\_\_\_\_

b. What is the general equation for this type of problem? \_\_\_\_\_

c. Define your variable. \_\_\_\_\_

d. Fill in the DRT chart.

	<b>r</b>	<b>t</b>	<b>D</b>

d. Write and solve an equation.

e. ANSWER the question.

## Part V: Relations, Functions, Function Notation, DV, IV

Due: \_\_\_\_\_

**Comparing:** In complete sentences, please define relation and function and describe the relationship between the two.

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**17. Function?** Are the following relations functions? Explain your answer using complete sentences and algebraic terms.

a)

x	y
-2	2
1	0
-2	3
-1	4

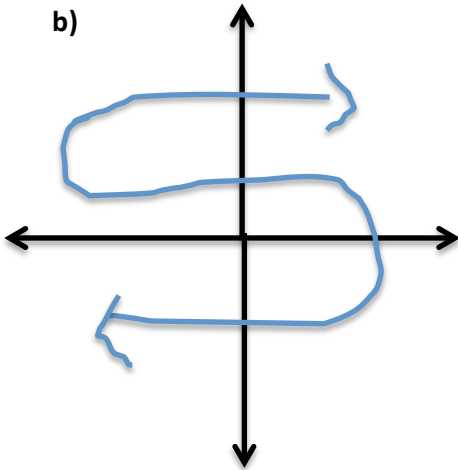
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b)



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**Function Notation:**

Given  $f(x) = -x^2 - 8$ , find  $f(-1)$ .

**Direct and Inverse Variation:** Determine whether the table is direct or inverse variation. Then write the equation for each table.

x	y
3.5	2
1	7
-1	-7

x	y
15	3
30	6
5	1

direct variation **OR** inverse variation

direct variation **OR** inverse variation

equation:

equation:

y varies directly with x. If  $y = -4$  when  $x = 2$ , find y when  $x = 9$ .

y varies inversely with x. If  $y = 40$  when  $x = 8$ , find x when  $y = 10$ .

## Part VI: Slope, Slope-Intercept, Standard Form, Parallel and Perpendicular Lines, Horizontal and Vertical Lines

Due: \_\_\_\_\_

28. Identify the slope and y-intercept. (2 points)	Identify the x-and-y intercepts. (2 points)
$y = 5x - 6$  $m =$ _____  $b =$ _____	$2x - 5y = 40$  x-intercept: _____  y-intercept: _____

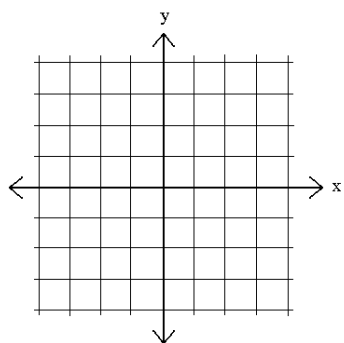
**Slope:** Find the slope of the line between the two points. Write your answers as reduced fractions, if possible.

a) (-3, 8) and (-1, 2)

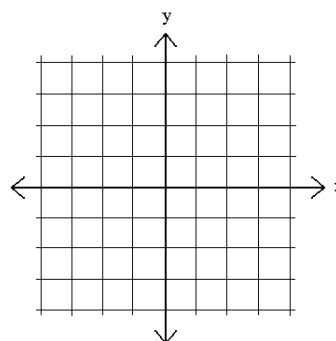
b) (4, -6) and (12, -6)

**Draw an example of a line with a positive slope, a negative slope, a slope of zero, and an undefined slope. (4 points)**

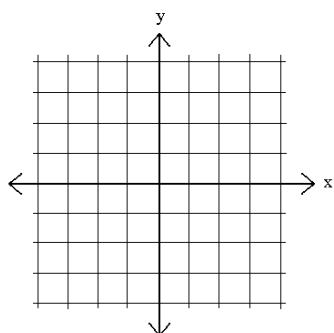
positive slope



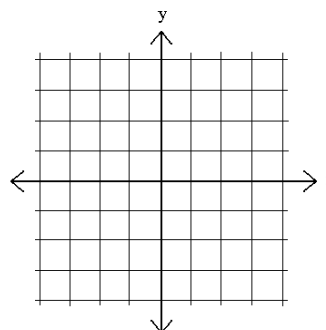
negative slope



slope of zero



undefined slope



**Graphing Linear Equations:** Please create a table of values for lines a and c, then graph ALL the linear equations on the coordinate planes provided. NAME YOUR LINES.

a)  $y = \frac{2}{5}x - 1$

b)  $y = -5$

c)  $3x - y = -9$

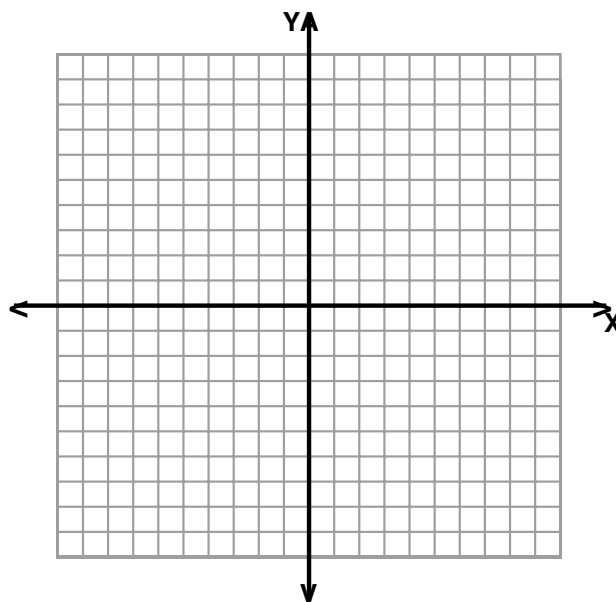
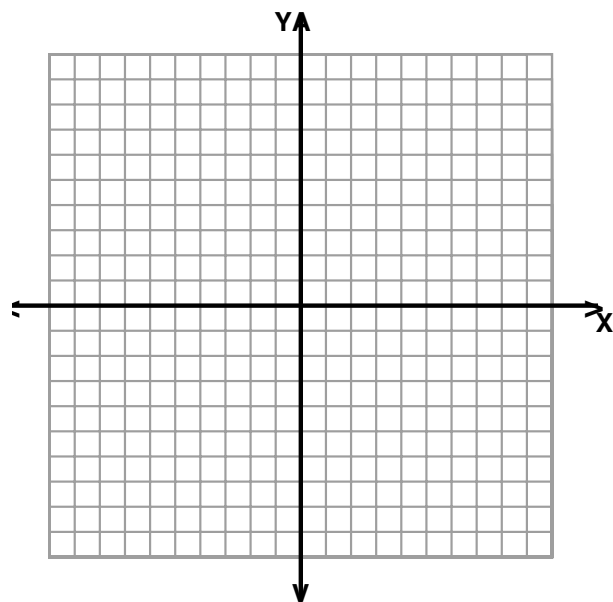
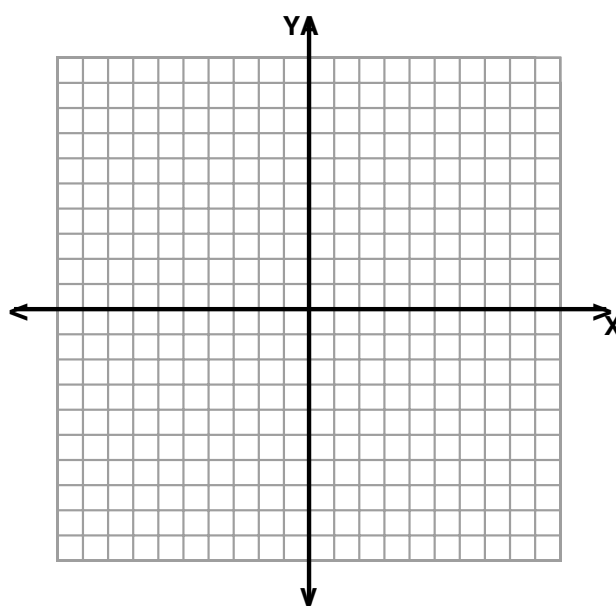
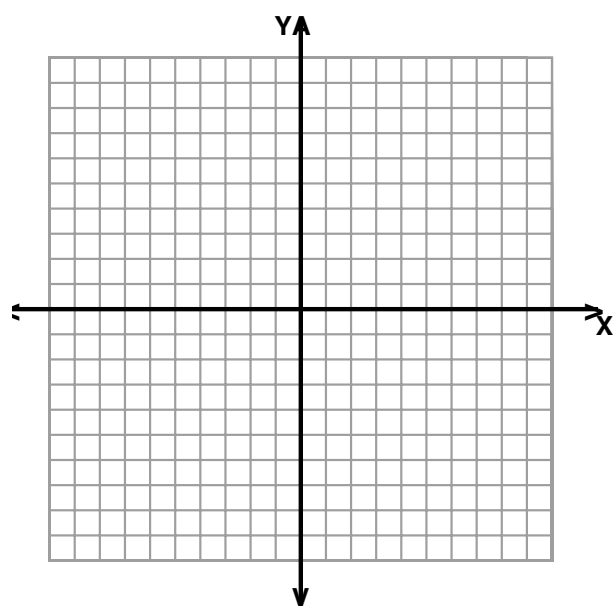
d)  $x = 1$

a)

x	y

c)

x	y



**Linear Relationship:** Ms. Scheld wanted to order some custom T-shirts that say “ALGEBRA IS LIFE” on them. She got two sales quotes from two different companies.

- MONSTER T-shirt Company charges \$12 per shirt.
- CRAZY T-shirt Company charges a flat fee of \$10 for the design, and then \$8 per shirt.

**PART A**

Write a linear function to model the relationship between the total cost and the number of shirts ordered for each company.

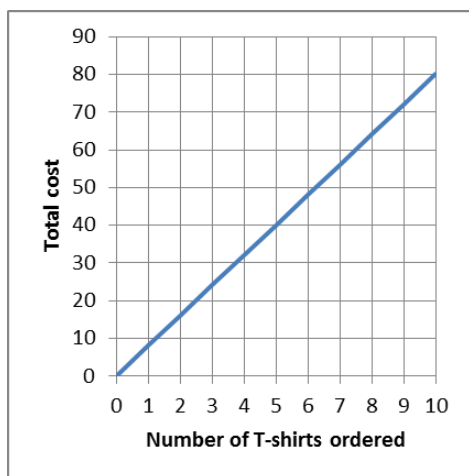
Equation for MONSTER

Equation for CRAZY

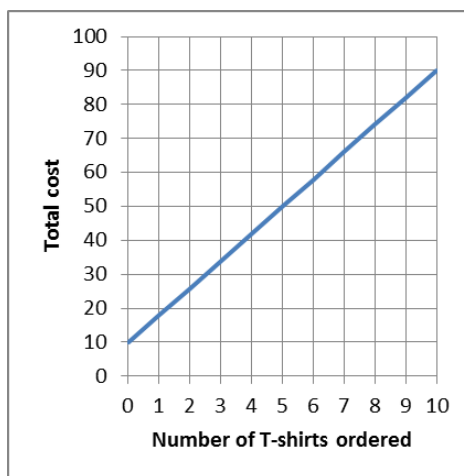
**PART B.** Which of the following graphs below corresponds to MONSTER? \_\_\_\_\_

**PART C.** Which of the following graphs corresponds to CRAZY? \_\_\_\_\_

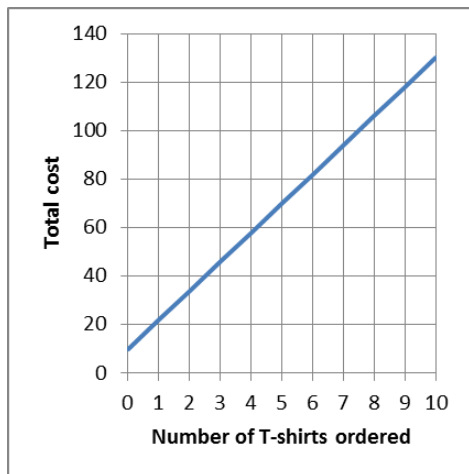
A



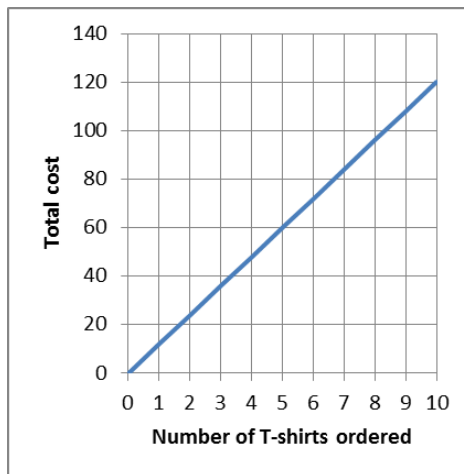
B



C



D



**Writing Equations:** Write an equation in the requested form using the given information.

a) Write the equation for the line in slope-intercept form that passes through (2, -1) and (4, -5).

b) Write an equation for the line in slope-intercept that is parallel to the line:  $y = -\frac{1}{4}x + 2$  and has a y-intercept of 5.

c) Write an equation for the line in slope-intercept form whose standard form equation is  $x - 2y = -9$ .

d) Write the equation of the line in STANDARD form whose equation in slope-intercept form is  $y = \frac{1}{4}x - 2$ .



**Math Task:** Use the following task to explain your solution and how you got your solution. Use complete sentences and be sure to include how you know your process, and would-be solution is reasonable.

Olivia and her brother William had a bicycle race. Olivia rode at a speed of 20 feet per second, while William rode at a speed of 15 feet per second. To be fair, Olivia decided to give William a 150-foot head start. The race ended in a tie. How far away was the finish line from where Olivia started?

[illegible]